WATER SUPPLY OUTLOOK FOR MONTANA

and

FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE,
and
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with Federal, State, and private organizations listed on the inside back cover of this report.

SNOW PILLOW RECORDS
1967 WATER YEAR

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season as they affect runoff will add to be an effective average. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1400 snow courses in Western United States and in the Columbia Basin in British Columbia. In the near future, it is anticipated that automatic snow water equivalent sensing devices along with radio telemetry will provide a continuous record of snow water equivalent at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data or reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

Listed below are water supply outlook reports based on Federal-State-Private Cooperative snow surveys. Those published by the Soil Conservation Service may be obtained from Soil Conservation Service, Room 507, Federal Building, 701 N. W. Glisan, Portland, Oregon 97209.

PUBLISHED BY SOIL CONSERVATION SERVICE

D. A. WILLIAMS, Administrator

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 507, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	P. O. Box "F", Palmer, Alaska 99645
Arizona	6029 Federal Building, Phoenix, Arizona 85205
Colorado (N. Mex.)	12417 Federal Building, Denver, Colorado 80202
Idaho	P. O. Box 38, Boise, Idaho 83701
Montana	P. O. Box 855, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4001 Federal Building, Salt Lake City, Utah 84111
Washington	840 Bon Marche Bldg., Spokane, Washington 99206
Wyoming	P. O. Box 340, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia

WATER SUPPLY OUTLOOK
For
MONTANA
and
FEDERAL-STATE-PRIVATE COOPERATIVE SNOW SURVEYS

Issued
October 1, 1967

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In Cooperation with
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MONTANA FALL RESUMÉ
October 1, 1967

Water Conditions - Soil Moisture - Reservoir Storage

Columbia Drainage

Streamflow was near to above average during the April through September period. Runoff from the Kootenai and Flathead River basins was less than anticipated because of almost nonexistent precipitation during July, August and September. Based on Provisional Data provided by the Geological Survey, April-September runoff was about 110-115 percent average in the Kootenai drainage and 105 to 110 percent in the Flathead drainage. The Bitterroot drainage was near average while streams in the upper Clark Fork were 10 to 15 percent above average.

Soils are dry at all elevations and good Fall rains or some snow pack will be necessary to bring moisture levels up to average.

Missouri Drainage

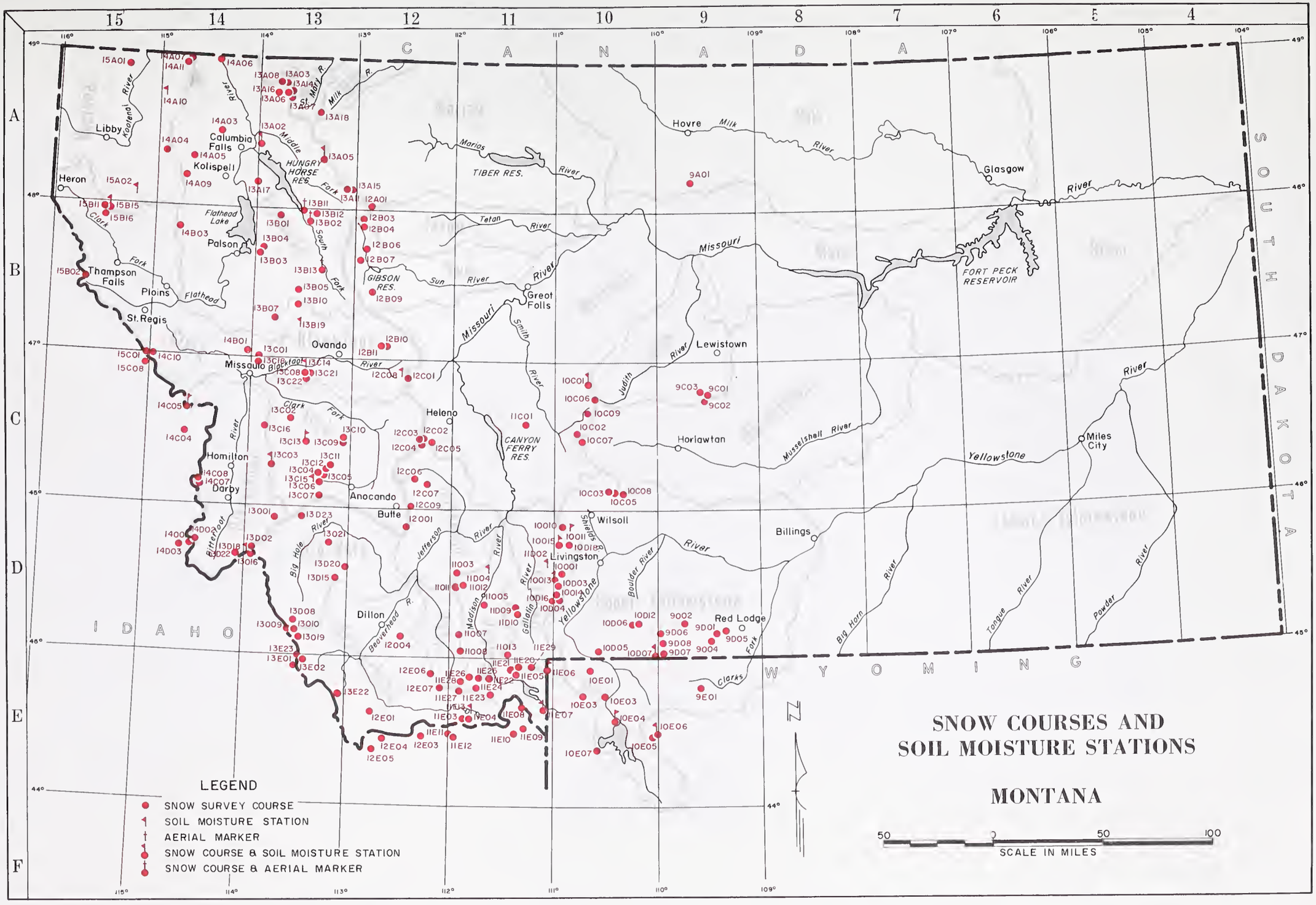
Data provided by the Geological Survey, Bureau of Reclamation and Montana Power Company indicate streamflow was above average in all Missouri River drainages during the April through September period, and was quite large in the Yellowstone and Missouri River headwater tributaries and from streams in Central Montana. Good snow pack, late runoff and adequate precipitation combined to produce the large flows. Late season irrigation supplies held up well considering the below average precipitation during July, August and September, in some areas.

Storage in irrigation reservoirs is generally below average but they should refill next spring with near average snow pack.

Soils in the Northern drainages are generally much drier than usual. Those farther south are near to a little below average, having been recharged by recent rain and melt from mid-September snow.

April-September runoff in the upper Yellowstone drainage was 130 to 145 percent average, increasing below the Big Horn River where runoff was near record proportions.

The Missouri River headwater streams had 130 to 140 percent average runoff during the six-months period. The Sun River produced about 120 percent average runoff.



INDEX to MONTANA SNOW COURSES and SOIL MOISTURE STATIONS

SNOW COURSES

COLUMBIA RIVER BASIN

KOOTENAI RIVER

Drainage Basin & Course Name	Number	Elev.	Sec.	Twp.	Range	Record Began	Measuring Dates 1/	Meas. By 2/
Baree Creek	15811	5500	36	26N	31W	1956	3,4,5,5½	2
Baree Midway	15816	4600	31	26N	30W	1965	3,4,5,5½	2
Baree Trail	15815	3800	5	25N	30W	1965	3,4,5,5½	2
Brush Creek	1LA04	5000	12	30N	26W	1937	3,4,5	1,2
Graves Creek	1LA11	4300	1	36N	25W	1965	3,4,5,5½,6	1,2
Red Mountain	15A01	6000	4	36N	29W	1937	3,4,5,5½,6	1,2
Weasel Divide	1LA07	5450	20	37N	24W	1937	3,4,5,5½,6	1,2

FLATHEAD RIVER

Bassoo Peak	1LB03	5150	11	24N	25W	1961	3,4,5	1,5
Beaver Lake	13A11	5900	31	28N	11W	1964	3,4,5	2
Big Creek	13B03	6750	7	22N	18W	1941	3,4,5, 6	1,5
Camp Misery	13A17	6400	30	28N	18W	1962	3,4,5,	1,2
Desert Mountain	13A02	5600	24	31N	19W	1937	1,2,3,4,5, 6	1,2
Fatty Creek	13B04	5500	8	22N	18W	1962	3,4,5, 6	1,5
Griffin Creek Divide	1LA09	5150	11	28N	25W	1960	3,4,5	1,5
Gunsight Lake	13B12	6300	35	26N	14W	1964	3,4,5	1
Hell Roaring Divide	1LA03	5770	35	32N	22W	1942	1,2,3,4,5,5½,6	2
Holbrook	13B13	4530	18	21N	13W	1951	1,2,3,4,5	1,2
Kishenehn	1LA06	3890	14	37N	22W	1954	3,4	6
Logan Creek	1LA05	4300	34	30N	24W	1937	3,4,5	1,2
Marias Pass	13A05	5250	34	30N	14W	1934	1,2,3,4,5	3
Mineral Creek	13A16	4000	29	35N	17W	1957	3,4,5	6
North Fork Jocko	13B07	6330	3	17N	17W	1941	3,4,5,5½,6	1,5
Spotted Bear Mountain	13B02	7000	23	25N	15W	1948	1,2,3,4,5	1
Trinkus Lake	13B01	6100	9	25N	17W	1948	3,4,5	1
Twin Creeks	13B11	3580	24	26N	16W	1951	1,2,3,4,5	1
Upper Holland Lake	13B05	7000	28	20N	15W	1948	3,4,5	1

CLARK FORK RIVER

Black Pine	13C13	7100	26	8N	15W	1959	Continuously	1
Copper Creek	12B10	5700	1	15N	9W	1962	3,4,5	1,2
Cotter Mine	12B11	6250	2	15N	9W	1962	3,4,5	1,2
Coyote Hill	13B10	4200	12	18N	16W	1947	1,2,3,4,5	1,2
El Dorado Mine	13C09	7800	23	8N	12W	1949	3,4	1
Fred Burr Pass	13C11	8000	12	6N	13W	1957	3,4,5	1
Gold Creek Lake	13C10	7200	14	8N	12W	1949	3,4	1
Heart Lake Trail	14C10	4800	11	14N	27W	1965	3,4,5	1,2
Hoodoo Basin	15C08	6000	17	14N	27W	1967	Continuously	1,2
Hoodoo Creek	15C01	5900	16	14N	27W	1937	1,2,3,4,5	1,2
Intergaard	13C04	6450	6	5N	13W	1936	2,3,4,5	4
Lubrecht Forest No. 3	13C21	5450	19	13N	14W	1951	1,2,3,4,5	8
Lubrecht Forest No. 4	13C22	4650	23	13N	15W	1951	1,2,3,4,5	8
Lubrecht Forest No. 6	13C08	4040	11	13N	15W	1951	1,2,3,4,5	8
Red Lion	13C12	7100	22	6N	13W	1958	3,4,5	1
Skalkaho Summit	13C03	7260	30	6N	17W	1937	3,4,5,5½,6	1
Slide Rock Mountain	13C02	7100	35	10N	16W	1937	3,4,5	1
Southern Cross	13C05	6500	8	5N	13W	1936	2,3,4	4
Spring Gulch	13C18	6000	12	14N	19W	1961	1,2,3,4,5	8
Storm Lake	13C07	7780	19	4N	13W	1939	1,2,3,4,5	1
Stuart Mill	13C06	6500	19	5N	13W	1936	2,3,4	4
Stuart Mountain	13C01	7400	6	14N	18W	1936	1,2,3,4,5,5½,6	8
TV Mountain	14B01	6800	33	15N	19W	1956	1,2,3,4,5,5½,6	8

BITTERROOT RIVER

Ambrose	13C16	6480	28	9N	18W	1960	3,4,5	1
East Fork R.S.	13D01	5400	16	2N	17W	1937	3,4	1.
Gibbons Pass	13D02	7100	4	2S	19W	1934	1,2,3,4,5,5½,6	1,3
Lost Horse	14C07	5940	5	4N	23W	1960	3,4,5,5½,6	1
Nez Perce Camp	14D02	5680	19	1S	23W	1937	3,4,5	1
Nez Perce Pass	14D01	6570	25	1S	24W	1937	3,4,5	1
Saddle Mountain	13D22	7940	5	2S	19W	1965	3,4,5,5½,6	1
Twin Lakes	14C08	6510	32	5N	23W	1960	3,4,5,5½,6	1

ST. MARY RIVER BASIN

Hudson Bay Divide	13A18	5800	24	34N	14W	1963	3,4,5	3
Iceberg Lake No. 3	13A03	5600	1	35N	17W	1922	5	3,9
Josephine Lower No. 9	13A14	4900	22	35N	16W	1955	5	3,9
Mount Allen No. 7	13A07	5700	27	35N	16W	1922	5	3,9
Piegan Pass No. 6	13A06	5500	27	35N	16W	1922	5	3,9
Ptarmigan No. 8	13A08	5800	36	36N	17W	1937	5	3,9

MISSOURI RIVER BASIN

BEAVERHEAD RIVER

Bloody Dick	13D10	7600	12	8S	16W	1948	3,4,5	1
Carter Creek	12D04	7400	22	8S	7W	1963	2,3,4	1
Red Creek Lake	13E22	8400	24	12S	13W	1965	3,4,5	1
Elk Horn Springs	13D15	7800	21	4S	12W	1935	3,4,5	3
Gold Stone	13D09	8100	11	8S	16W	1948	3,4,5	1
Lakeview Canyon	11E04	6930	26	14S	2W	1948	3,4,5	10
Lakeview Ridge	11E03	7400	27	14S	2W	1948	3,4,5	10
Lemhi Pass	13E01	7480	9	10S	15W	1948	3,4	1
Lemhi Ridge	13E23	8100	4	10S	15W	1967	3,4	1
Trail Creek	13E02	7090	15	10S	15W	1948	3,4	1
White Pine Ridge	12E01	8850	18	14S	9W	1948	3,4,5	1

RUBY RIVER

Clover Meadow	11D08	8600	28	9S	2W	1963	3,4,5	1
Divide	12E07	7900	14	12S	4W	1963	3,4,5	1
Notch	12E06	8500	18	11S	4W	1963	3,4,5	1

BIG HOLE RIVER

Abundance Lake	13D20	8800	7	3S	11W	1963	3,4,5	1
Darkhorse Lake	13D19	8600	4	8S	16W	1963	3,4,5	1
Foolhen	13D21	8280	11	1S	13W	1963	3,4,5	1
Jahnke Creek	13D08	7340	25	7S	16W	1948	3,4,5	1
Palisade Creek	13D23	8450	3	2N	15W	1967	3,4,5	1

JEFFERSON RIVER

Berry Meadow	12C07	7300	8	5N	5W	1962	3,4,5	1
Copper Mountain	12C09	7700	13	3N	7W	1966	2,3,4,5	4
Picnic Grounds	12C06	6500	21	5N	6W	1941	2,3,4	4
Pipestone Pass	12D01	7200	10	1N	7W	1938	1,2,3,4,5	1

MADISON RIVER

Call Road	11D07	8050	21	8S	2W	1962	3,4,5	1
Four Mile	11D12	6900	5	4S	2W	1965	3,4,5	1
Freezeout Lake	11E25	7200	6	12S	1E	1965	3,4,5,5½,6	2
Freezeout Mountain	11E26	8250	26	11S	1W	1965	3,4,5,5½,6	2
Hebgen Dam	11E05	6550	22	11S	3E	1934	1,2,3,4,5	3
Jack Creek	11D05	7500	13	6S	1E	1961	3,4	1
Lake Creek	11E22	6100	27	11S	1E	1965	3,4,5,5½,6	2
Lion Mountain	11E28	8760	23	11S	2W	1967	Continuously	2
Lower Twin	11D11	7900	12	4S	3W	1965	3,4,5	1
Meridian Creek	11E23	7000	31	12S	1E	1965	3,4,5,5½,6	2
North Meadow	11D03	7500	24	3S	3W	1961	3,4,5	1
Potomageton Park	11E21	7150	33	10S	3E	1965	3,4,5	2
Sentinel Creek	11E20	8300	17	10S	3E	1965	3,4,5	2
Teepee Creek	11E24	8000	15	12S	1W	1965	3,4,5,5½,6	2
Upper West Fork	11E27	8750	6	12S	2W	1966	3,4,5,5½,6	2
West Yellowstone	11E07	6700	34	13S	5E	1934	Continuously	1,3,6

GALLATIN RIVER

Arch Falls	10D14	7350	3	5S	6E	1963	1,2,3,4,5,5½,6	1
Bear Basin	11D09	8150	9	6S	3E	1963	3,4,5	1
Bridger Bowl	10D15	7250	25	1N	6E	1965	Continuously	1
Carrot Basin	11E29	9000	18	10S	4E	1967	Continuously	2
Devil's Slide	10D04	8100	14	5S	6E	1935	1,2,3,4,5,5½,6	1
Hood Meadow	10D03	6600	22	4S	6E	1935	2,3,4,5,5½,6	1
Lick Creek	10D13	6860	10	4S	6E	1964	Continuously	1
Little Park	11D10	7400	22	6S	3E	1963	3,4,5	1
Maynard Creek	10D18	6210	19	1N	7E	1967	Continuously	1
New World	10D01	6700	24	3S	6E	1939	2,3,4	1
Shower Falls	10D16	8100	14	5S	6E	1966	Continuously	1
Taylor Peaks	11D13	8500	26	9S	2E	1967	Continuously	1
Twenty-One Mile	11E06	7150	1	11S	5E	1934	1,2,3,4,5	3

MISSOURI RIVER MAIN STEM

Boulder Mountain	11C01	7950	1	9N	3E	1963	3,4,5	1
Chessman Reservoir	12C05	6200	2	8N	5W	1936	1,2,3,4,5	3
Deadman Creek	10C09	6450	23	12N	8E	1966	3,4,5,5½,6	1
Elk Peak	10C07	8000	10	8N	8E	1963	3,4,5	1
Grasshopper	10C02	7000	19	9N	8E	1938	3,4,5	1
Kings Hill	10C01	7500	34	13N	8E	1934	3,4,5,5½,6	1,3
Rocky Boy	9A01	5200	15	28N	16E	1941	3,4,	7
Stemple Pass	12C01	6600	16	13N	7W	1934	3,4,5	3
Ten Mile Lower	12C02	6600	12	8N	6W	1935	1,2,3,4,5	3
Ten Mile Middle	12C03	6800	13	8N	6W	1934	1,2,3,4,5	3
Ten Mile Upper	12C04	8000	19	8N	5W	1935	1,2,3,4,5	3

SUN-TETON-MARIAS RIVERS

Badger Pass	13A15	6900	4	27N	11W	1964	3,4,5	2
Cabin Creek	12B06	5200	33	23N	10W	1949	3,4,5	2
Five-Bull	12B09	5700	25	20N	10W	1948	3,4,5	1
Freight Creek	12A01	6000	13	26N	10W	1948	3,4,5	1
Goat Mountain	12B07	7000	20	22N	10W	1934	3,4,5	3
Wrong Creek	12B04	5700	32	25N	10W	1949	3,4,5	2
Wrong Ridge	12B03	6800	17	25N	10W	1949	3,4,5	2

JUDITH RIVER

Avalanche	9C02	7100	24	12N	17E	1966	3,4,5	1
Crystal Lake	9C01	6100	19	12N	18E	1941	3,4,5	1
Rock Creek	9C03	5600	8	12N	18E	1966	3,4,5	1
Spur Park	10C06	8000	20	12N	9E	1963	Continuously	1

UPPER YELLOWSTONE RIVER

Bald Ridge	10C05	7500	11	4N	10E	1961	3,4,5	1
Camp Senia	9D01	7890	2	8S	18E	1937	3,4,5,5½,6	1
Cooke Station	9D07	8150	19	9S	15E	1966	3,4,5	2
Crevice Mountain	10D05	8400	22	9S	9E	1935	3,4	2
Fisher Creek	9D06	9100	11	9S	14E	1966	Continuously	1,2
Grizzly Peak	9D05	8400	26	7S	13E	1961	1,2,3,4,5	1,2
Independence	10D06	8000	22	7S	12E	1940	3,4,5	1
Monument Peak	10D12	9000	22	7S	12E	1961	3,4,5	1
Northeast Entrance	10D07	7400	33	9S	14E	1937	Continuously	1,6
Porcupine R.S.	10C03	6500	10	4N	10E	1938	3,4,5	1
Sacajawea	10D10	6550	36	2N	6E	1960	3,4,5	1
South Fork Shields	10C08	8100	13	4N	10E	1965	3,4,5	1
Timberline Creek	9D04	8850	10	8S	18E	1961	3,4,5	1
West Rosebud	9D02	7500	9	7S	16E	1960	3,4	4
White Mill	9D08	8700	18	9S	15E	1967	3,4,5	2

SOIL MOISTURE STATIONS

COLUMBIA RIVER BASIN

KOOTENAI RIVER

Drainage Basin & Course Name	Number	Elev.	Sec.	Twp.	Range	Record Began	Measuring Dates 1/	Meas. By 2/
Baree Trail	15815M	3800	5	25N	30W	1964	Monthly	2
Murphy Lake R.S.	14A10M	3000	5	34N	25W	1964	Monthly	2
Raven R.S.	15A02M	3050	2	26N	29W	1964	Monthly	2

FLATHEAD RIVER

Desert Mountain	13A02M	5600	24	31N	19W	1956	Monthly	1
Marias Pass	13A05M	5250	34	30N	14W	1950	Monthly	1

CLARK FORK RIVER

Black Pine	13C13M	7100	26	8N	15W	1965	Monthly	1
Georgetown Lake	13C15M	6450	6	5N	13W	1962	Monthly	1
Lubrecht Forest	13C14M	4100	11	13N	15W	1961	Monthly	8
Seeley Lake	13B19M	4030	21	17N	15W	1963	Monthly	2
Skalkaho Summit	13C03M	7260	30	6N	17W	1964	Monthly	1

BITTERROOT RIVER

Gibbons Pass	13D18M	7100	4	2S	19W	1962	Monthly	1
Lolo Pass	14C05M	5250	11	10N	24W	1963	Monthly	1

MISSOURI RIVER BASIN

BEAVERHEAD RIVER

Lakeview	11E13M	6700	23	14S	2W	1962	Monthly	10

MADISON RIVER

Red Bluff	11D04M	4800	7	3S	1E	1961	Monthly	7
West Yellowstone	11E07M	6700	34	13S	5E	1966	Monthly	6

GALLATIN RIVER

Bridger Bowl	10D15M	7250	25	1N	6E	1965	Monthly	1
College Site	11D02M	4856	18	2S	5E	1956	Monthly	1
Lick Creek	10D13M	6860	10	4S	6E	1965	Monthly	1
Twenty-One Mile	11E06M	7150	1	11S	5E	1963	Monthly	6

MISSOURI RIVER MAIN STEM

Kings Hill	10C01M	7420	34	13N	8E	1963	Monthly	1
Stemple Pass	12C08M	6350	16	13N	7W	1963	Monthly	1

YELLOWSTONE RIVER

Battle Ridge	10D11M	6020	32	2N	7E	1960	Monthly	1
Northeast Entrance	10D07M	7350	33	9S	14E	1962	Monthly	6

LEGEND

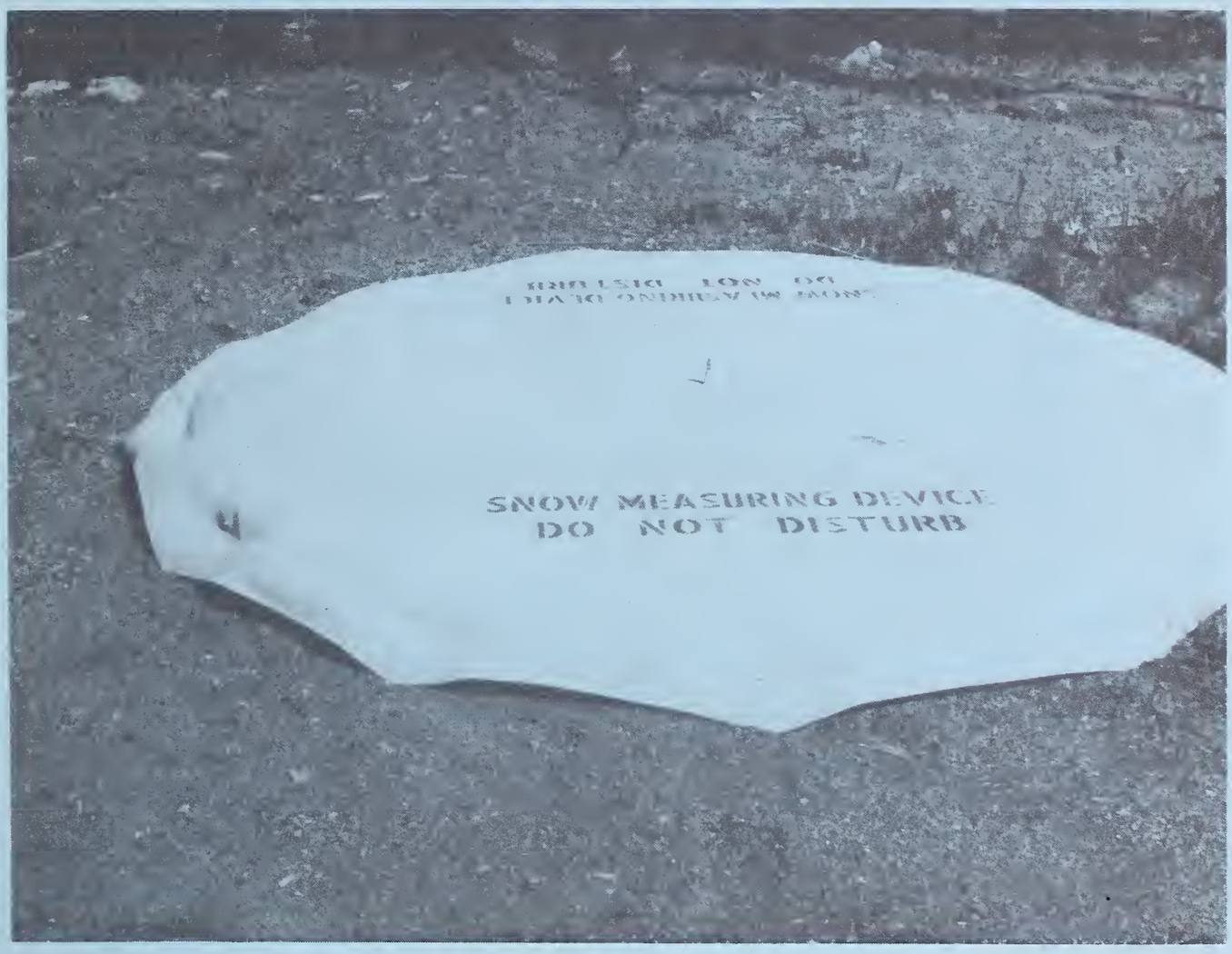
1/ Numerals 1,2,3,4,5,5½,6 refer to January 1, February 1, March 1, April 1, May 1, May 15 and June 1.

2/ Numerals refer to Agency that secures the snow survey as follows:

1. U. S. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geological Survey
4. Montana Power Company
5. U. S. Indian Service
6. U. S. National Park Service
7. MSU Agriculturel Experiment Station
8. U. of M. School of Forestry
9. Dominion Water & Power Bureau
10. U. S. Bureau of Sport Fisheries & Wildlife

M - Soil Moisture

THE SNOW PILLOW



Snow Pillow installation at Lick Creek, Montana

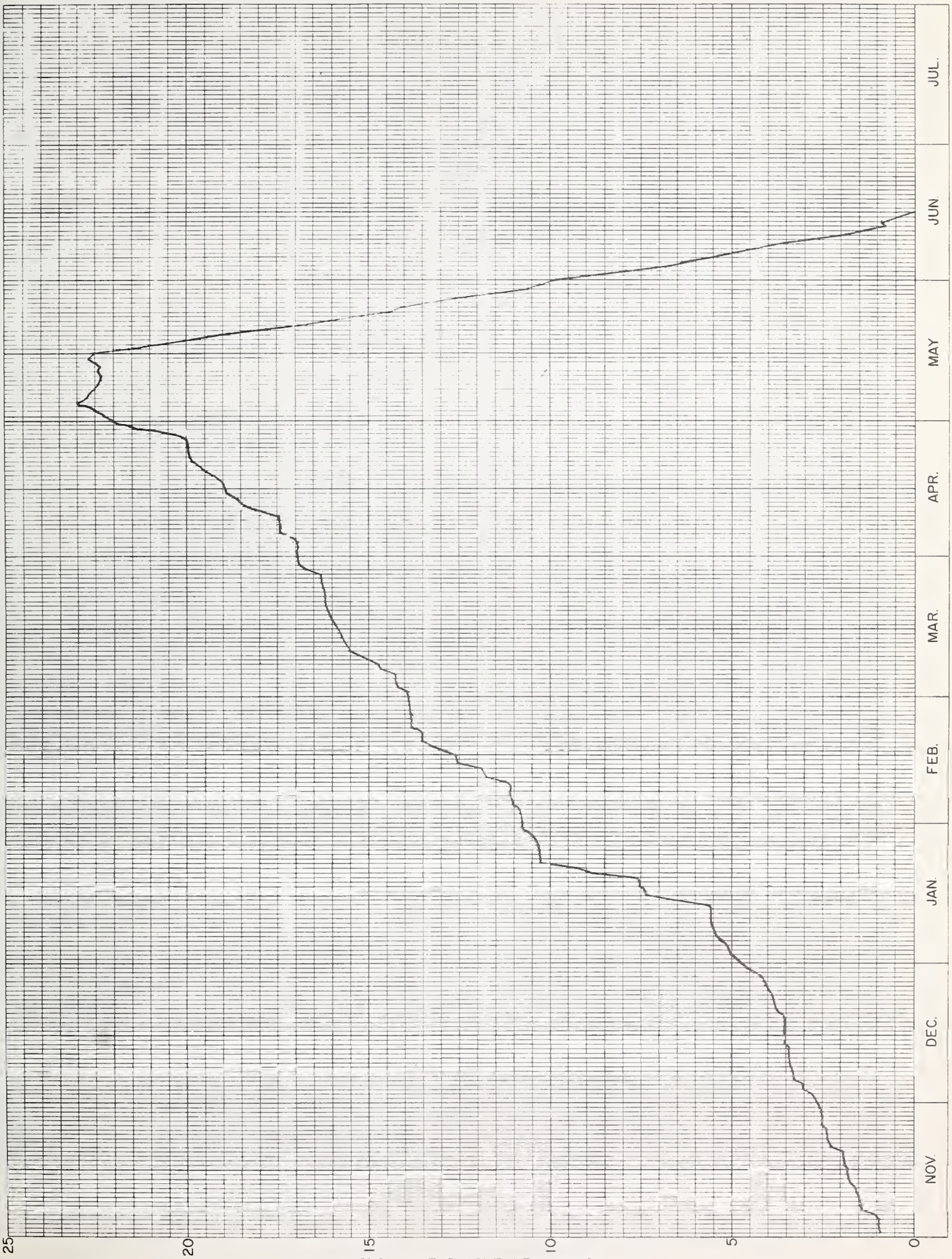
During the past few years the Soil Conservation Service has tested snow measuring devices for obtaining a continuous record of snow accumulation and melt. The most versatile and promising is the nylon reinforced butyl or neoprene snow pillow, which is usually about 12 feet in diameter and filled with a methanol alcohol-water solution to a depth of three inches. The pillow is placed on a level ground surface. A hose connects the pillow to a manometer or pressure transducer in an instrument shelter. As snow falls on the pillow the amount of fluid rise in the manometer is equivalent to the water content in the snow pack. A water level recorder installed in the manometer provides a continuous record of the snow water content. Telemetered (transmitted by radio signal) information is obtained by connecting a pressure transducer to the pillow. The signal from the transducer is converted to equivalent inches of water content at the receiving station. Air temperature, total precipitation, soil moisture and soil temperature can be telemetered, in addition to snow water content.

USDA-SCS-PORTLAND, OREG. 1967

SNOW PILLOW DATA
WATER YEAR 1967

BLACK PINE

No. 13C13 Elev. 7100 Drainage: Clark Fork

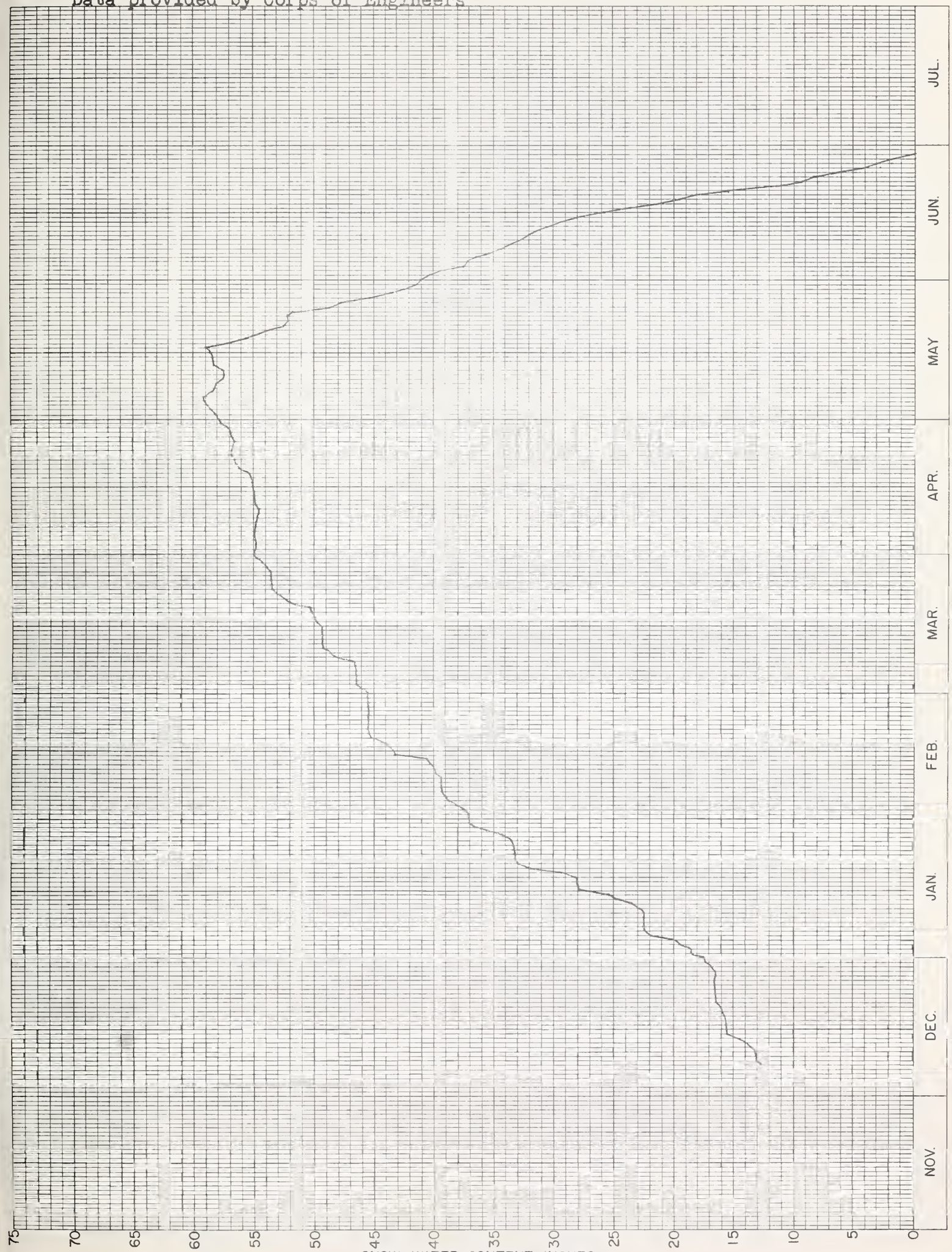


SNOW PILLOW DATA
WATER YEAR 1967

HOODOO BASIN

No. 15C08 Elev. 6000 Drainage: Clark Fork

Data provided by Corps of Engineers



U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

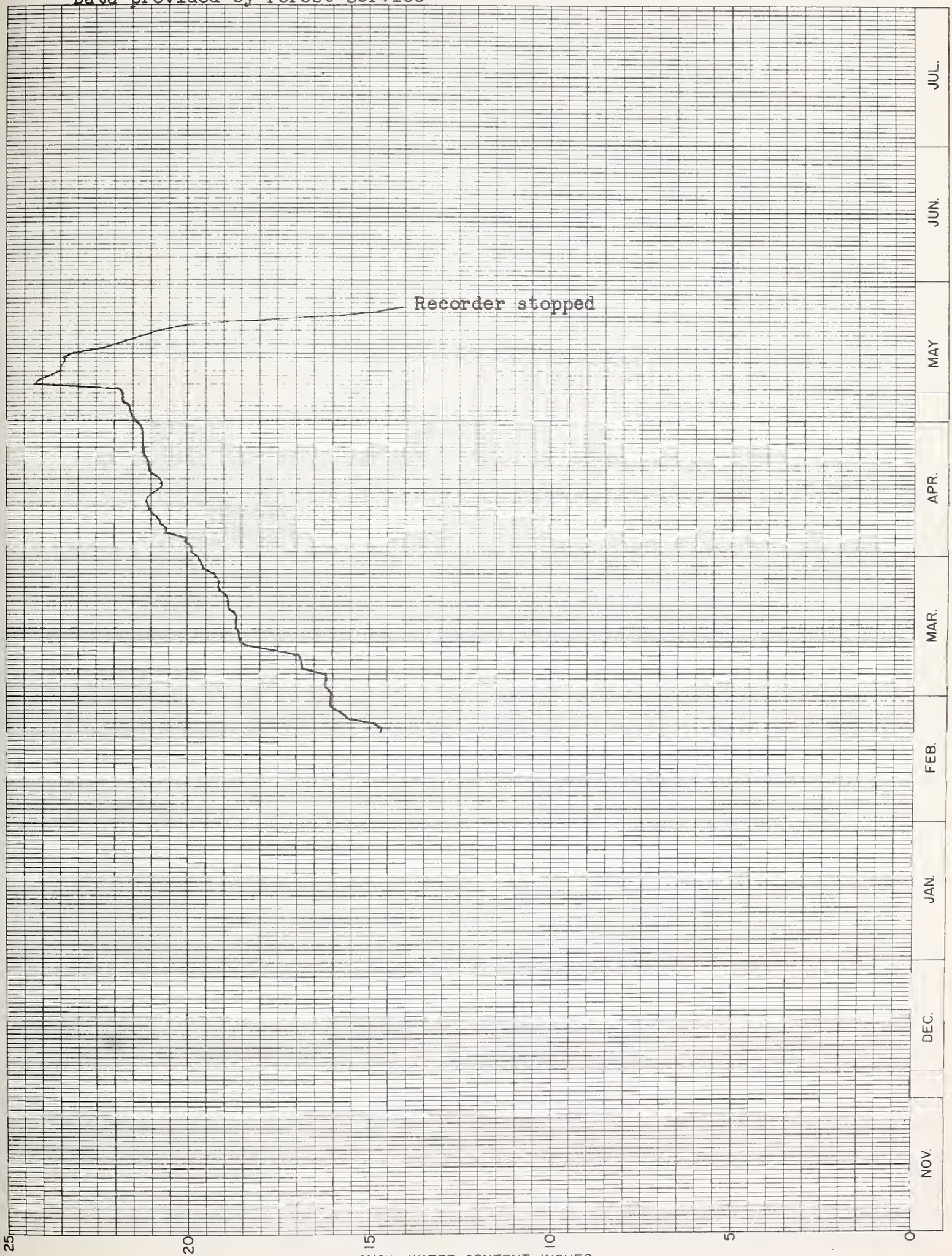
7-P-18764C-L

SNOW PILLOW DATA
WATER YEAR 1967

LION MOUNTAIN

No. 11E28 Elev. 8760 Drainage: Madison

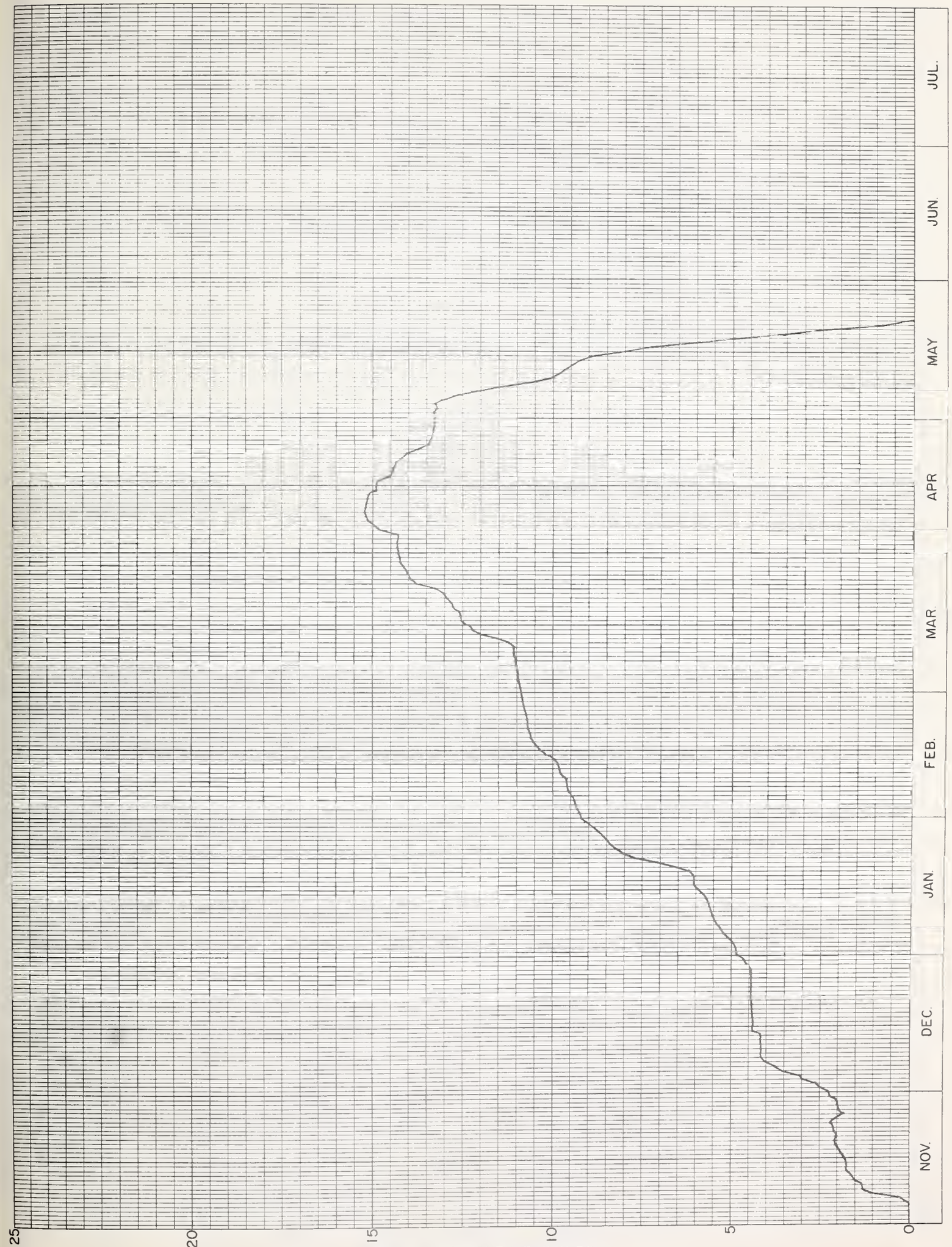
Data provided by Forest Service



SNOW PILLOW DATA
WATER YEAR 1967

WEST YELLOWSTONE

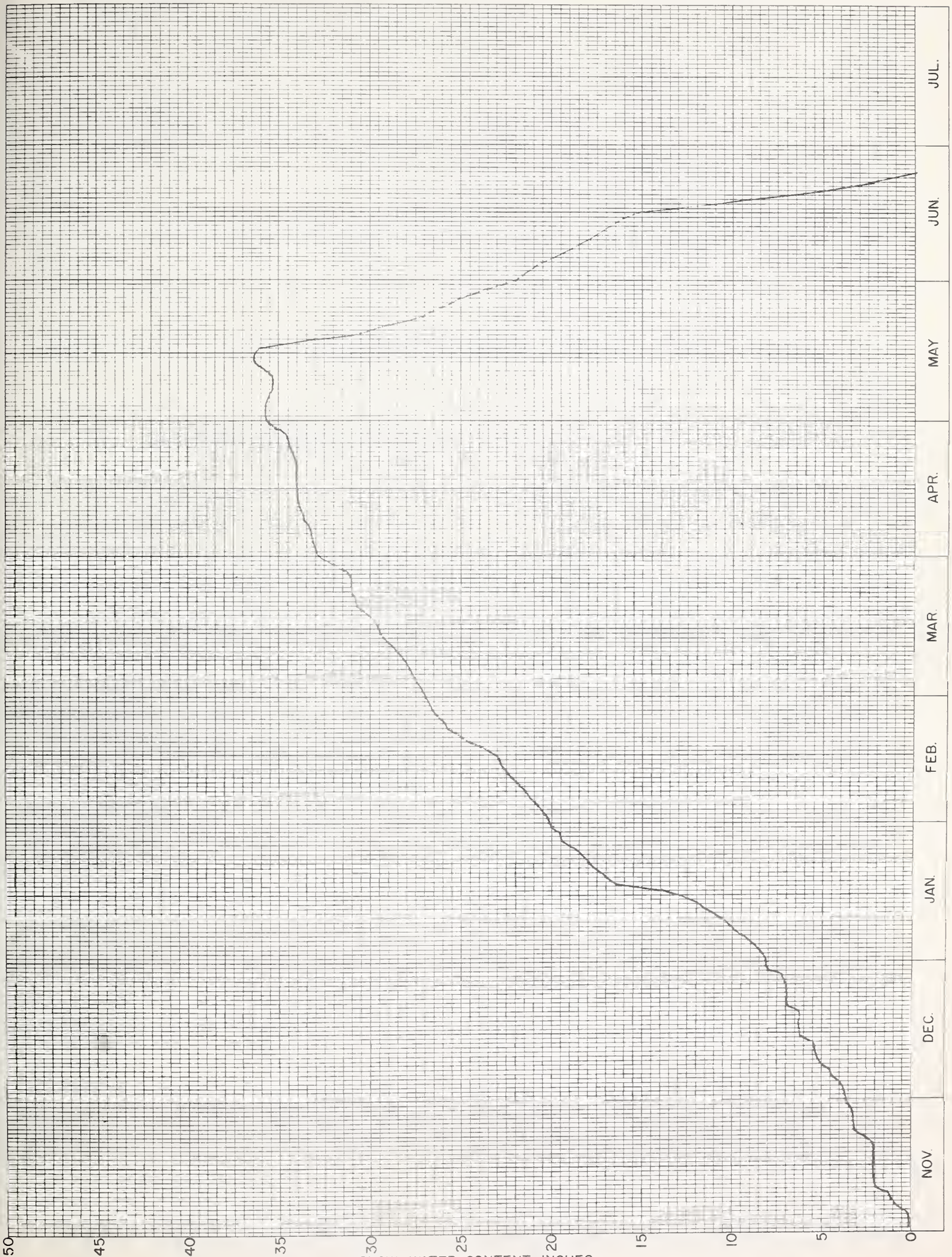
No. 11E07 Elev. 6700 Drainage: Madison



SNOW PILLOW DATA
WATER YEAR 1967

BRIDGER BOWL

No. 10D15 Elev. 7250 Drainage: Gallatin



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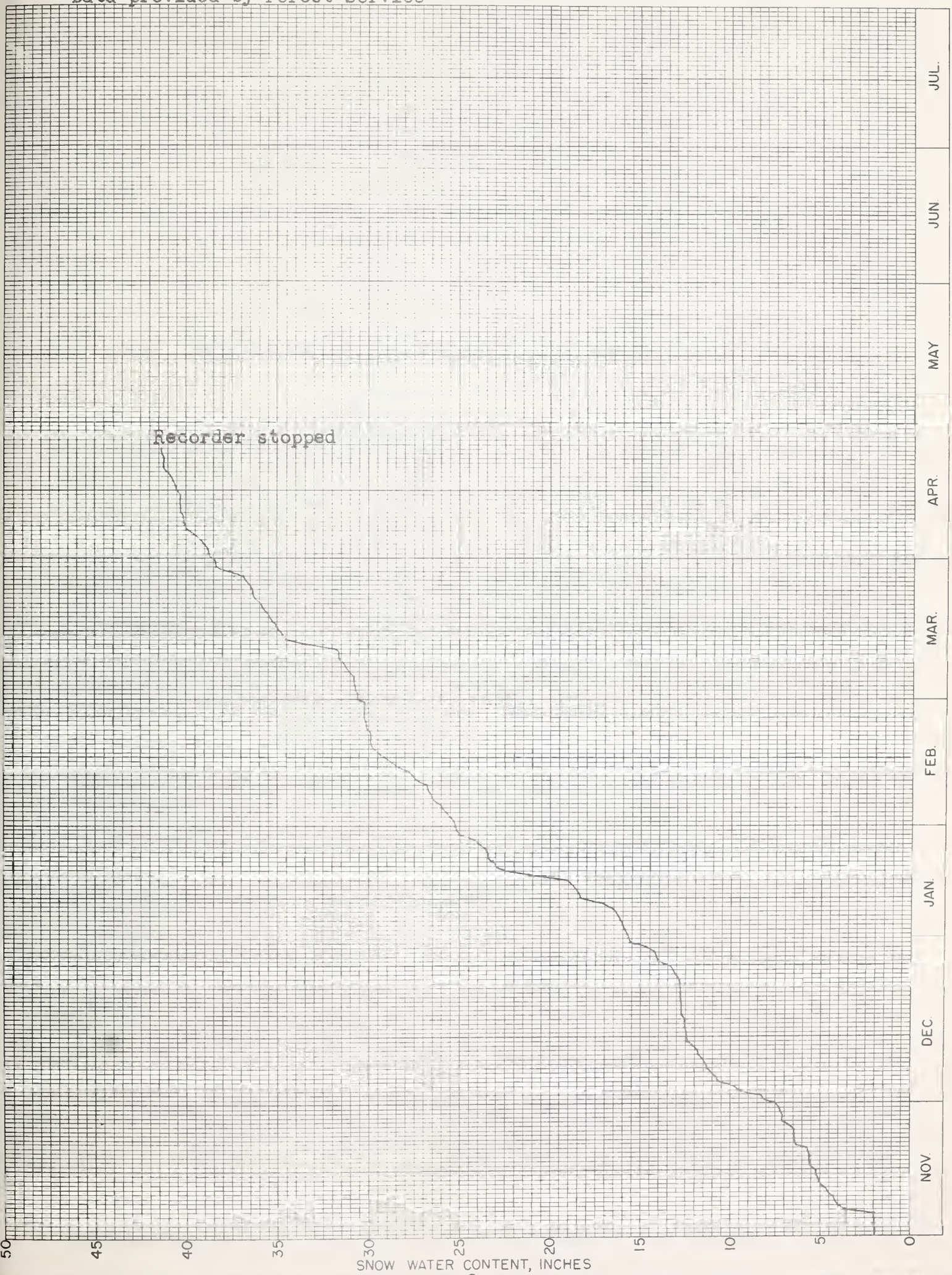
7-P-18764B-L

SNOW PILLOW DATA
WATER YEAR 1967

CARROT BASIN

No. 11E29 Elev. 9000 Drainage: Gallatin

Data provided by Forest Service

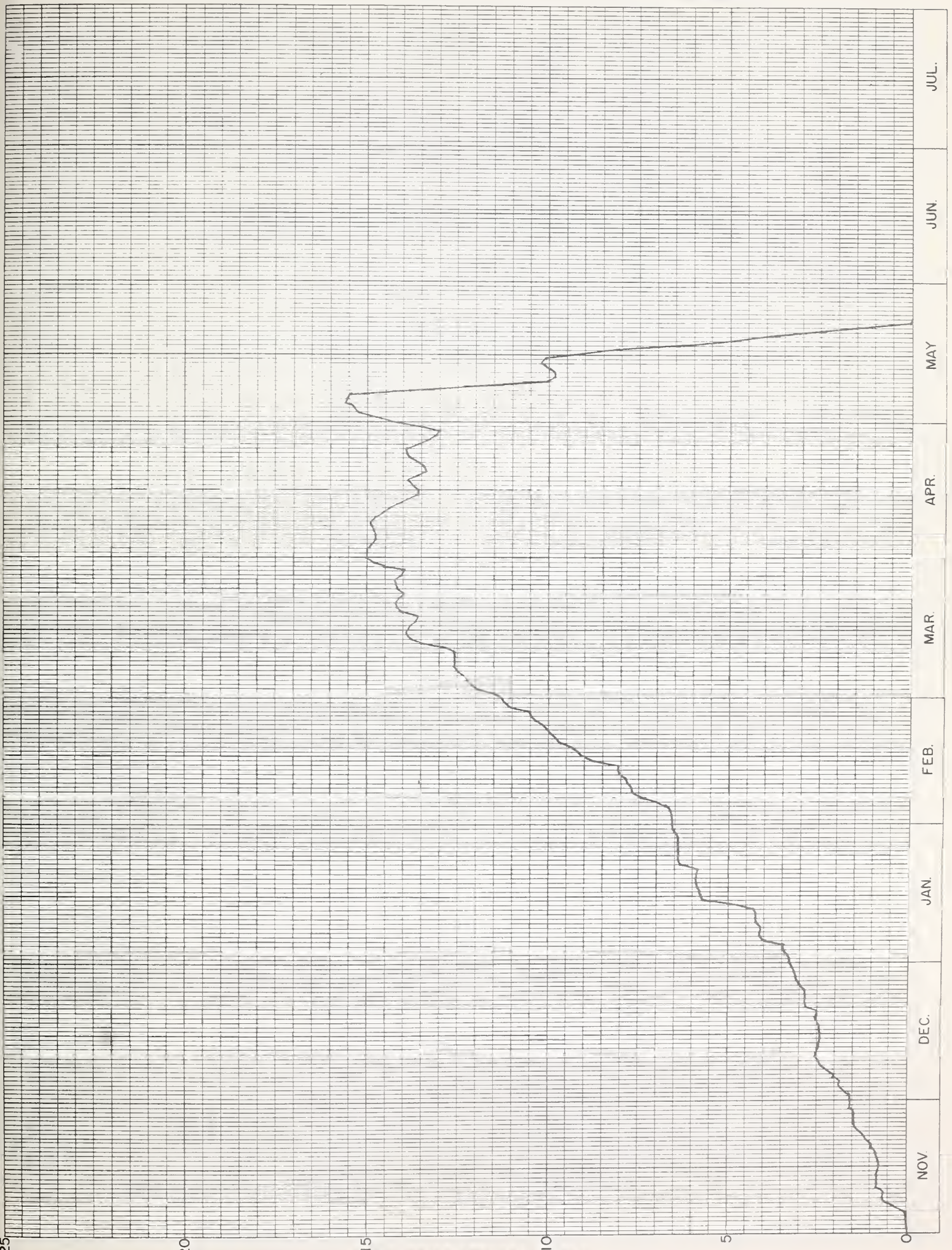


7-P-19764B-1

SNOW PILLOW DATA
WATER YEAR 1967

LICK CREEK

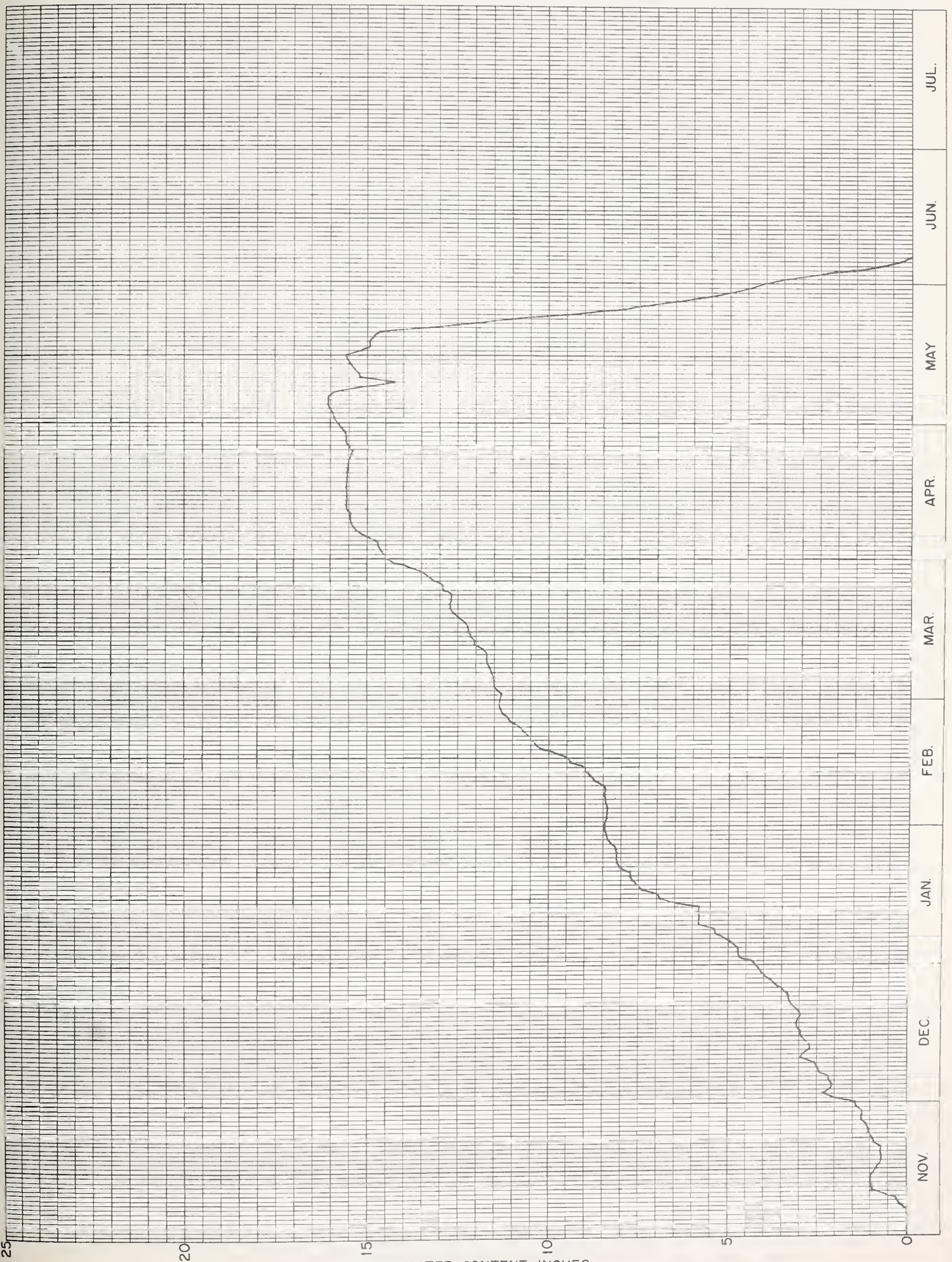
No. 10D13 Elev. 6860 Drainage: Gallatin



SNOW PILLOW DATA
WATER YEAR 1967

MAYNARD CREEK

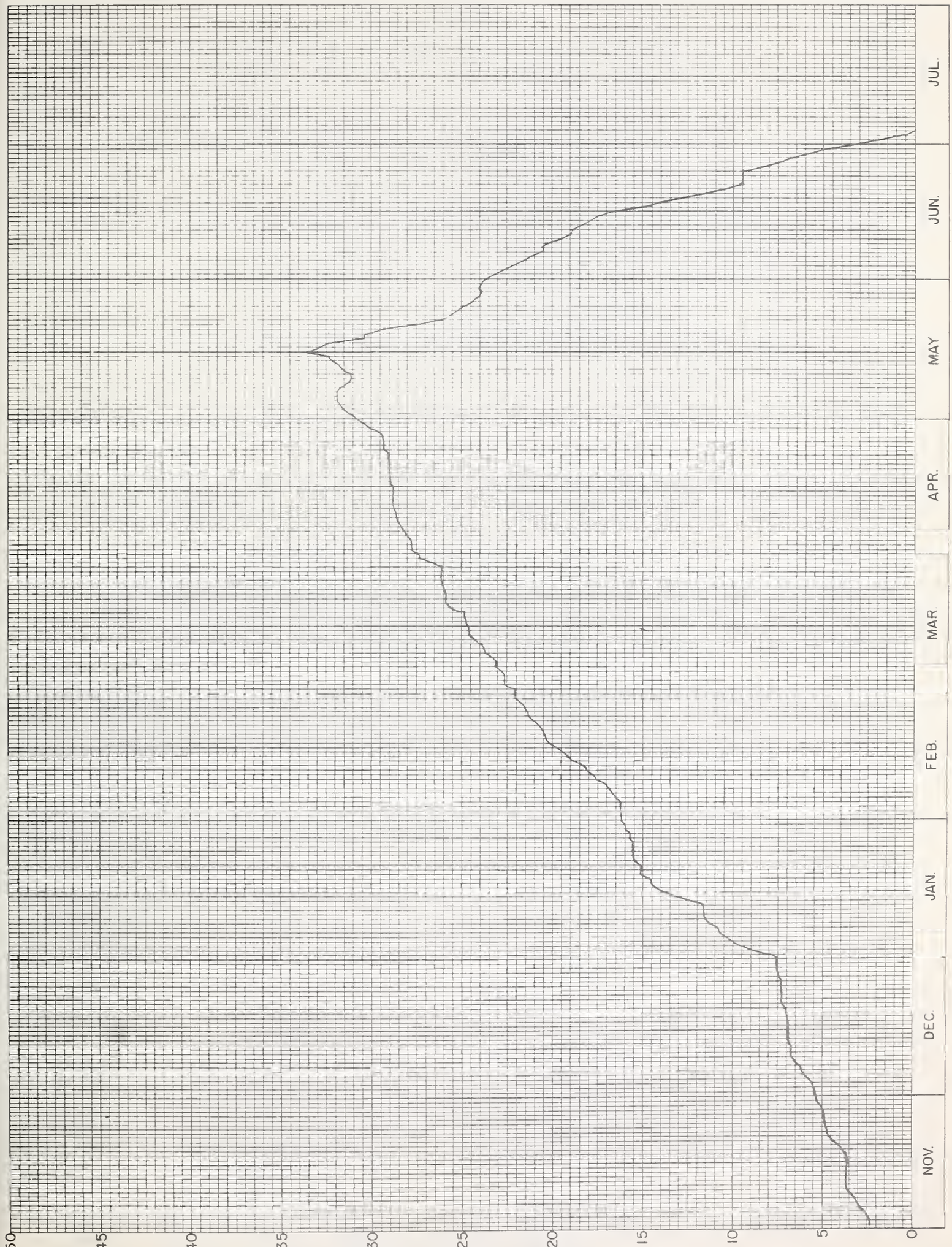
No. 10D18 Elev. 6210 Drainage: Gallatin



SNOW PILLOW DATA
WATER YEAR 1967

SHOWER FALLS

No. 10D16 Elev. 8100 Drainage: Gallatin

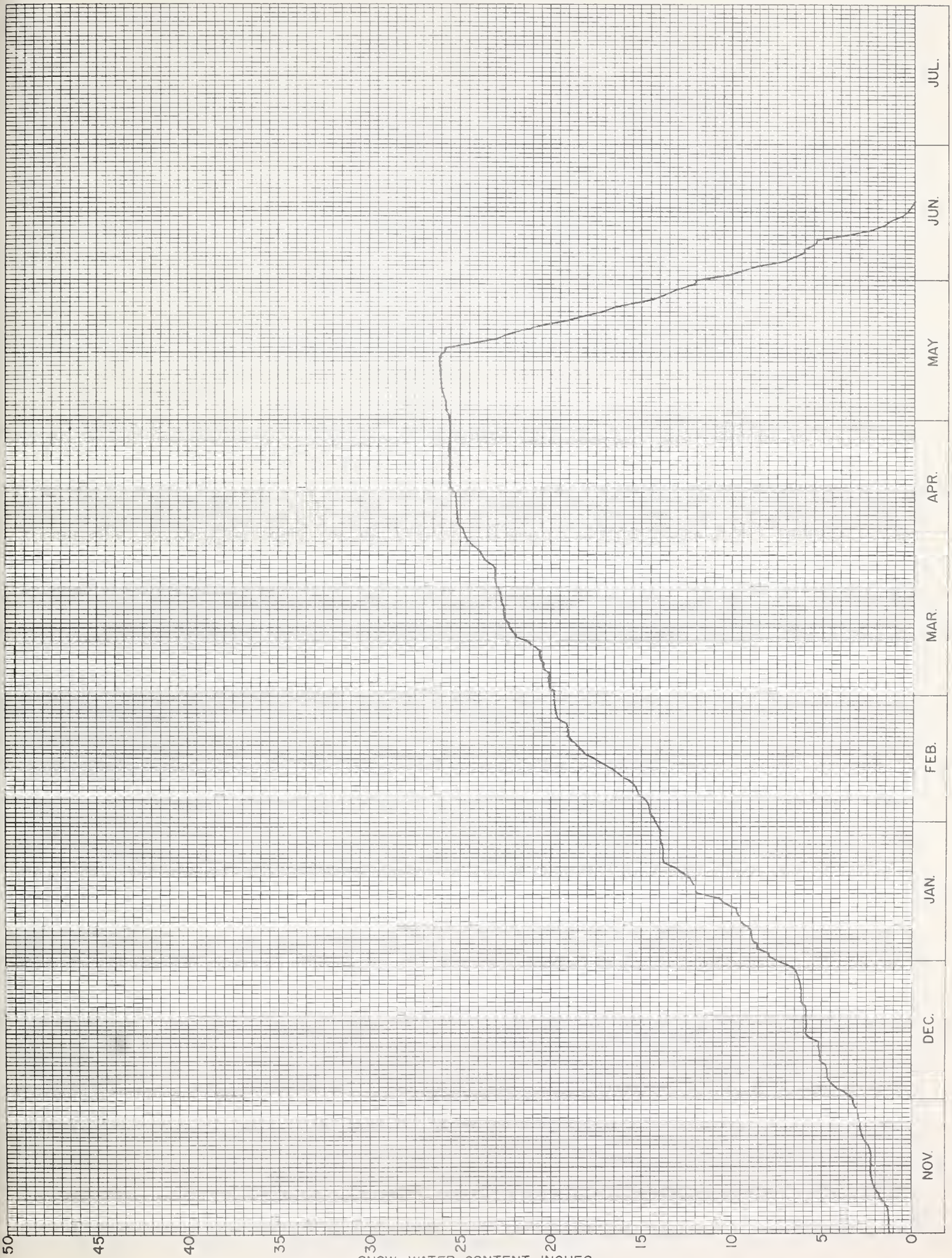


7-P-18764B-L

SNOW PILLOW DATA
WATER YEAR 1967

TAYLOR PEAKS

No. 11D13 Elev. 8500 Drainage: Gallatin



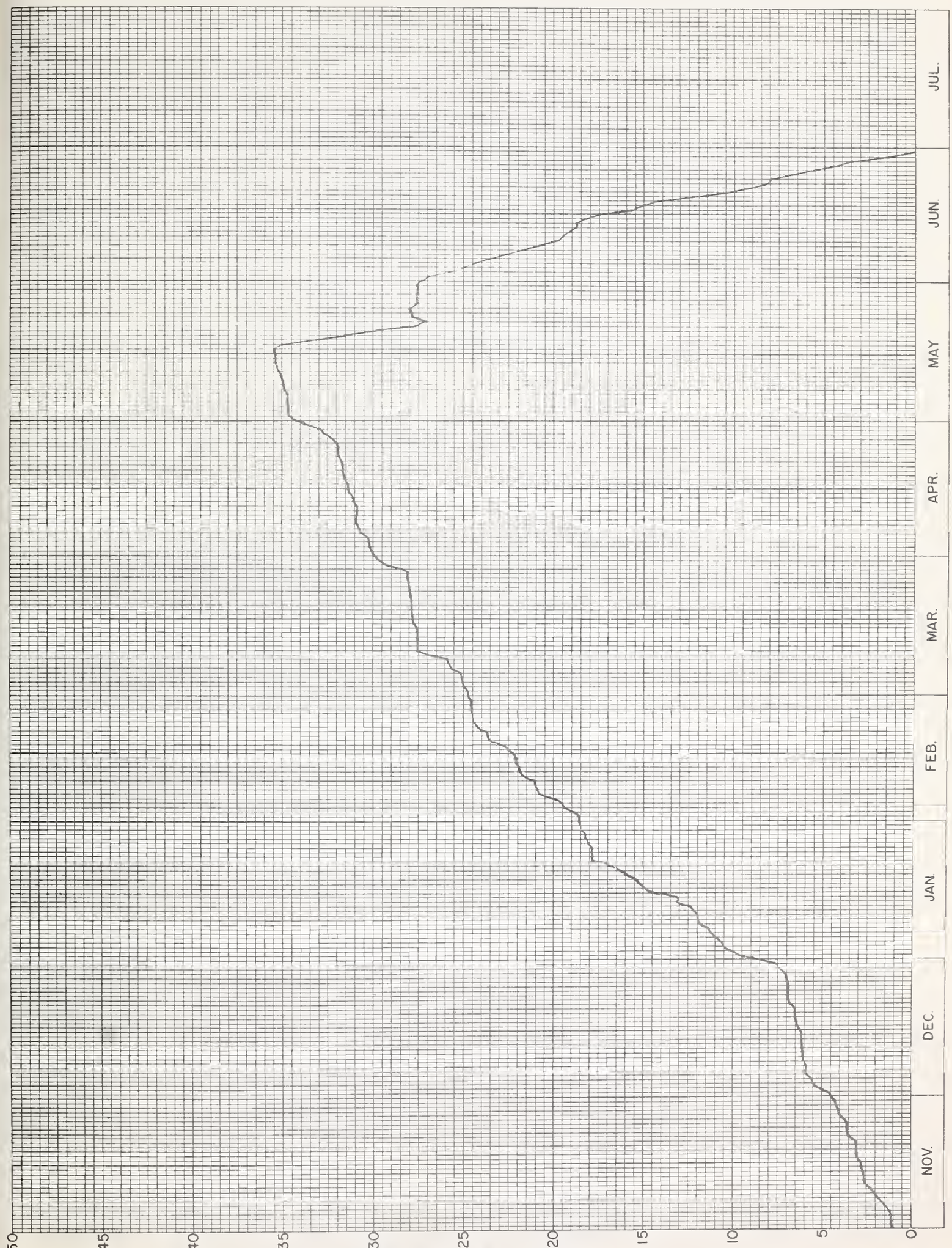
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

7-P-18764B-L

SNOW PILLOW DATA
WATER YEAR 1967

SPUR PARK

No. 10C06 Elev. 8000 Drainage: Judith

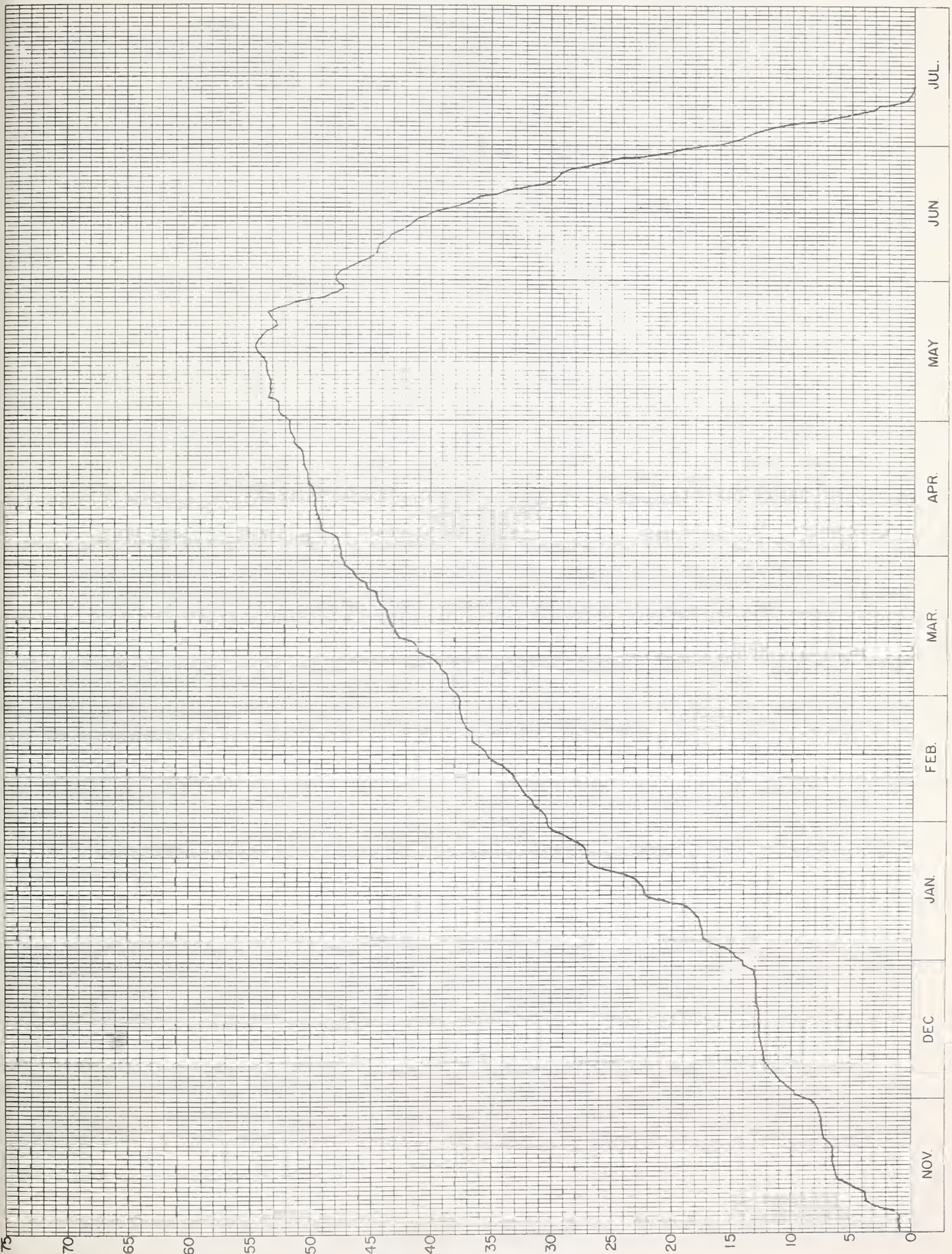


7-P-18764B-L

SNOW PILLOW DATA
WATER YEAR 1967

FISHER CREEK

No. 9D06 Elev. 9100 Drainage: Yellowstone

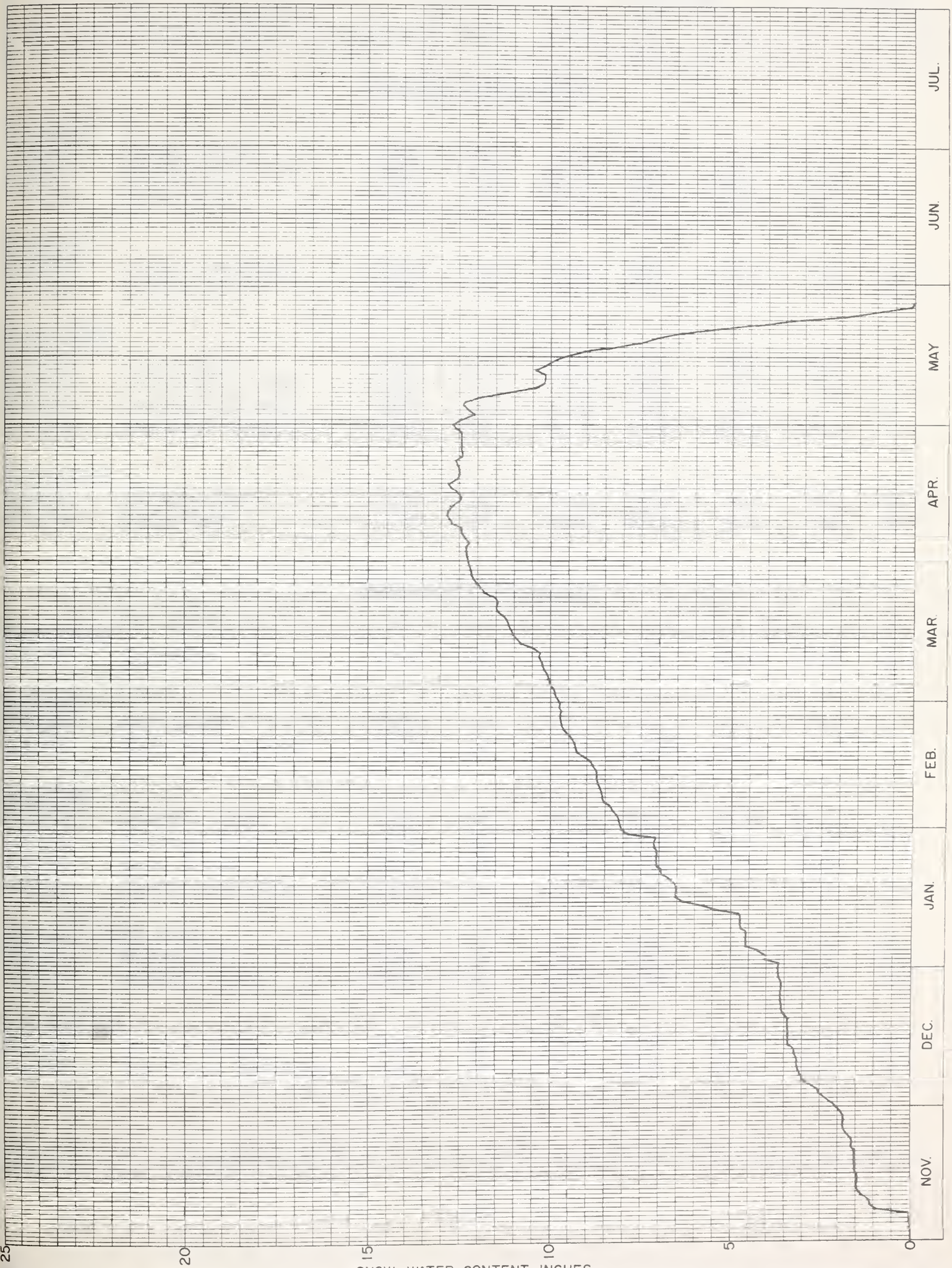


U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
7-P-18764C-L

SNOW PILLOW DATA
WATER YEAR 1967

NORTHEAST ENTRANCE

No. 10D07 Elev. 7400 Drainage: Yellowstone



SOIL MOISTURE DATA

AS OF JULY 1, 1967

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Kootenai								
15B15M	Baree Trail	3800	48	7.5	7/3	4.5	-	-
14A10M	Murphy Lake R.S.	3000	48	22.6	7/5	19.0	20.4	-
15A02M	Raven R.S.	3050	48	23.0	7/3	20.8	17.4	-
Flathead								
13A02M	Desert Mountain	5600	54	8.4	7/5	7.9	8.2	8.2
13A05M	Marias Pass	5250	54	6.5	6/30	5.7	-	5.2
Clark Fork								
13C13M	Black Pine	7100	48	10.0	6/30	8.7	8.5	-
13C15M	Georgetown Lake	6450	48	9.0	6/30	9.8	7.3	7.4
13B19M	Seeley Lake R.S.	4030	48	11.9	7/4	9.1	-	-
13C03M	Skalkaho Summit	7260	48	10.8	6/30	10.2	10.4	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	6/29	6.3	6.1	6.4
14C05M	Lolo Pass	5250	48	10.6	6/28	9.6	9.8	9.7
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	7/3	13.5	13.8	14.3
Madison								
10D04M	Red Bluff	4800	40	4.7	-	-	1.6	-
11E07M	West Yellowstone	6700	48	6.5	6/28	3.6	-	-
Gallatin								
10D15M	Bridger Bowl	7250	48	15.8	6/19	15.2	16.4	-
11D02M	College Site	4856	54	14.5	6/30	16.1	11.4	10.4
10D13M	Lick Creek	6860	48	18.8	6/29	18.6	18.8	-
11E06M	Twenty-One Mile	7150	48	10.0	6/28	9.4	8.4	8.3
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	6/29	10.6	10.8	10.8
12C08M	Stemple Pass	6230	48	5.9	6/29	4.8	5.2	5.2
Yellowstone								
10D11M	Battle Ridge	6020	48	17.6	6/29	15.3	14.8	14.6
10D07M	Northeast Entrance	7350	48	9.4	6/31	10.4	9.0	8.9

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF AUGUST 1, 1967

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
COLUMBIA RIVER BASIN								
Kootenai								
15B15M	Baree Trail	3800	48	7.5			5.1	-
14A10M	Murphy Lake R.S.	3000	48	22.6	8/1	18.5	-	-
15A02M	Raven R.S.	3050	48	23.0	8/3	18.3	17.5	-
Flathead								
13A02M	Desert Mountain	5600	54	8.4	8/1	6.2	6.2	6.3
13A05M	Marias Pass	5250	54	6.5	7/31	3.4	-	3.8
Clark Fork								
13C13M	Black Pine	7100	48	10.0	7/31	8.7	8.1	-
13C15M	Georgetown Lake	6450	48	9.0	7/25	5.8	3.7	4.5
13B19M	Seeley Lake R.S.	4030	48	11.9			8.1	-
13C03M	Skalkaho Summit	7260	48	10.8	7/31	10.6	9.4	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	7/28	4.6	4.5	4.6
14C05M	Lolo Pass	5250	48	10.6	7/26	5.5	5.1	6.2
MISSOURI RIVER BASIN								
Beaverhead								
11E13M	Lakeview	6700	48	15.3	8/1	9.6	5.2	9.0
Madison								
10D04M	Red Bluff	4800	40	4.7	8/4	1.4	1.2	4.8
11E07M	West Yellowstone	6700	48	6.5	7/28	2.8	-	-
Gallatin								
10D15M	Bridger Bowl	7250	48	15.8	8/2	15.1	16.4	-
11D02M	College Site	4856	54	14.5	7/28	9.4	7.6	7.8
10D13M	Lick Creek	6860	48	18.8	8/1	17.2	17.4	-
11E06M	Twenty-One Mile	7150	48	10.0	7/28	7.9	3.7	4.7
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	7/28	8.8	8.6	9.2
12C08M	Stemple Pass	6230	48	5.9	7/28	3.2	4.0	4.6
Yellowstone								
10D11M	Battle Ridge	6020	48	17.6	8/2	12.4	10.5	10.6
10D07M	Northeast Entrance	7350	48	9.4	8/2	7.2	6.0	6.7

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF SEPTEMBER 1, 1967

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
COLUMBIA RIVER BASIN								
Kootenai								
15B15M	Baree Trail	3800	48	7.5	-	-	4.7	-
14A10M	Murphy Lake R.S.	3000	48	22.6	8/8	17.8	21.5	-
15A02M	Raven R.S.	3050	48	23.0	8/31	15.9	17.4	-
Flathead								
13A02M	Desert Mountain	5600	54	8.4	9/1	4.8	5.0	5.1
13A05M	Marias Pass	5250	54	6.5	9/1	2.8	3.0	3.5
Clark Fork								
13C13M	Black Pine	7100	48	10.0	8/31	7.8	8.5	-
13C15M	Georgetown Lake	6450	48	9.0	Station discontinued			
13B19M	Seeley Lake R.S.	4030	48	11.9	-	-	5.0	-
13C03M	Skalkaho Summit	7260	48	10.8	9/1	9.2	9.6	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	8/29	2.9	2.8	4.8
14C05M	Lolo Pass	5250	48	10.6	9/1	4.1	2.9	4.7
MISSOURI RIVER BASIN								
Beaverhead								
11E13M	Lakeview	6700	48	15.3	9/2	5.1	7.1	7.0
Madison								
10D04M	Red Bluff	4800	40	4.7	-	-	1.2	1.4
11E07M	West Yellowstone	6700	48	6.5	8/28	1.9	-	-
Gallatin								
10D15M	Bridger Bowl	7250	48	15.8	9/1	15.1	16.5	-
11D02M	College Site	4856	54	14.5	9/2	7.6	8.6	7.2
10D13M	Lick Creek	6860	48	18.8	8/31	15.1	16.9	-
11E06M	Twenty-One Mile	7150	48	10.0	8/28	4.0	2.0	2.6
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	8/25	6.5	7.2	8.9
12C08M	Stemple Pass	6230	48	5.9	8/31	2.6	3.7	4.6
Yellowstone								
10D11M	Battle Ridge	6020	48	17.6	9/1	8.4	8.9	9.2
10D07M	Northeast Entrance	7350	48	9.4	8/30	4.1	5.1	5.6

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF OCTOBER 1, 1967

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Kootenai								
15B15M	Baree Trail	3800	48	7.5	9/21	3.3	4.0	-
14A10M	Murphy Lake R.S.	3000	48	22.6			18.9	-
15A02M	Raven R.S.	3050	48	23.0			18.4	-
Flathead								
13A02M	Desert Mountain	5600	54	8.4			4.8	5.5
13A05M	Marias Pass	5250	54	6.5	10/1	2.5	3.5	3.8
Clark Fork								
13C13M	Black Pine	7100	48	10.0	9/26	7.4	8.2	-
13C15M	Georgetown Lake	6450	48	9.0	Station discontinued			
13B19M	Seeley Lake R.S.	4030	48	11.9			4.1	-
13C03M	Skalkaho Summit	7260	48	10.8	10/2	10.3	10.1	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	9/29	2.3	4.1	5.2
14C05M	Lolo Pass	5250	48	10.6	9/29	3.1	2.1	5.5
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	10/2	4.8	5.3	6.0
Madison								
10D04M	Red Bluff	4800	40	4.7			1.5	1.9
11E07M	West Yellowstone	6700	48	6.5	9/28	1.8	3.2	-
Gallatin								
10D15M	Bridger Bowl	7250	48	15.8	10/2	15.0	16.4	-
11D02M	College Site	4856	54	14.5	9/29	7.9	7.6	7.3
10D13M	Lick Creek	6860	48	18.8			17.7	-
11E06M	Twenty-One Mile	7150	48	10.0	9/28	2.5	2.9	3.2
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	9/29	5.2	6.0	8.1
12C08M	Stemple Pass	6230	48	5.9	9/29	1.9	2.5	4.2
Yellowstone								
10D11M	Battle Ridge	6020	48	17.6	10/2	9.4	9.2	10.0
10D07M	Northeast Entrance	7350	48	9.4	9/29	3.7	4.1	5.4

**AVERAGE FOR PERIOD OF RECORD

RESERVOIR STORAGE DATA

AS OF SEPTEMBER 30, 1967

(1000 Acre Feet)

BASIN	RESERVOIR	USEABLE CAPACITY	USEABLE STORAGE THIS YEAR	USEABLE STORAGE LAST YEAR	USEABLE STORAGE AVERAGE
LUMBIA RIVER BASIN					
athead	Hungry Horse	3,428.0	3,196.0	3,139.0	3,392.9
	Flathead Lake	1,791.0	1,772.0	1,719.0	1,683.3
	Camas (Sum of 4)	45.2	20.9	20.7	29.2
	Mission Valley (Sum of 8)	100.3	6.9	15.1	17.0
ark Fork	Georgetown Lake	31.0	28.7	22.4	26.5
	Noxon Rapids	334.6	324.0	332.6	-
tterroot	Como	34.9	0.0	0.8	2.9
	Painted Rocks	31.7	25.1	17.8	27.2
SSOURI RIVER BASIN					
averhead	Clark Canyon	328.9	134.1	71.9	-
	Lima	84.0		7.4	18.5
by	Ruby	38.8		7.9	7.1**
dison	Hebgen Lake	377.5	310.4	337.8	262.6
	Ennis Lake	41.0	39.3	39.5	37.3
llatin	Middle Creek	8.0	2.7	1.6	2.5**
ssouri	Canyon Ferry	2,043.0	1,709.0	1,333.0	1,742.1**
	Hauser & Helena	61.9	60.7	62.4	58.6
	Lake Helena	10.4	10.0	10.7	9.5
	Holter Lake	81.9	79.5	78.1	74.7
	Smith River	10.7		3.5	3.7**
	Ackley Lake	5.8		2.9	3.8
	Durand	7.0		1.8	3.9
	Martinsdale	23.1		7.6	7.5
	Deadman's Basin	72.2		26.6	28.1
	Fort Peck	19,410.0	17,440.0	16,460.0	11,308.3
n	Gibson	105.0	23.4	12.6	39.1
	Willow Creek	32.3	15.6	16.2	18.2
	Pishkun	32.0	7.3	11.3	20.1
rias	Lower Two Medicine				
	Four Horns	19.2		12.3	10.2
	Swift	30.0	5.0	-	14.2
	Lake Frances	112.0	71.1	77.4	90.8
	Tiber	1,347.0	626.8	596.7	684.9
lk	Fresno	127.2	75.8	97.0	61.1
	Nelson	66.8	38.5	47.9	38.8
	Lake Sherburne	66.1	3.6	2.2	8.8
llowstone	Mystic Lake	20.8	20.9	20.7	20.3
	Tongue River	68.0		10.2	20.6
	Cooney	27.5	13.6	13.9	12.0
g Horn	Yellowtail	1,356.0	1,052.0	601.7	-

NOTE: ALL AVERAGES BASED ON 1948-1962 (15 YEAR PERIOD). ** AVERAGE FOR PERIOD OF RECORD

Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
Region 1, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Bureau of Sports Fisheries and Wildlife
Red Rock Lakes Refuge
Monida, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

U. S. Soil Conservation Service
Montana, Wyoming, Idaho

Soil and Water Conservation Districts
Montana Counties

U. S. Bonneville Power Administration
Portland, Oregon

U. S. National Park Service
Yellowstone National Park
Glacier National Park

Montana Power Company
Butte, Montana

State Water Conservation Board
Helena, Montana

North Montana Branch Station
Agricultural Experiment Station
Havre, Montana

Montana State University
Agricultural Experiment Station
Bozeman, Montana

University of Montana
School of Forestry
Missoula, Montana

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch, Dept. of Lands and Forests
Victoria, British Columbia

Department of Northern Affairs and National Resources
Calgary, Alberta

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 98
Bozeman, Montana 59715

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COOPERATIVE SNOW SURVEYS

Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation , navigation , mining and industry

"The Conservation of Water begins with the Snow Survey"